

## BOWEL OBSTRUCTION FOLLOWING OPERATIONS OCCURRING DURING CONVALESCING PERIOD\*

By ALANSON WEEKS, M. D., and  
LE ROY BROOKS, M. D.

(From the Department of Surgery, University of California Medical School, St. Luke's Hospital).

The menace of bowel obstruction following an abdominal operation is constantly with us. We have had personal experience with bowel obstruction following the simplest types of work in the peritoneal cavity.

The cause of death in these patients is a most interesting phase of the subject. The amazingly painstaking experimental work of men in the laboratory such as Whipple, Bacon, Anslow and Eppler, of Hartwell and Hoguet, and of Alvarez and Ellis has aided the surgeon in reducing the mortality. Still far too many of these cases end fatally and it is relatively unimportant to the practical surgeon whether the toxemia is due to a toxin from the intestinal mucosa or from intestinal contents, or whether it is due to shock or to dehydration, unless it points a way to relief. Surgeons have known since Kocher's early work that the intestinal contents in patients suffering from obstruction are toxic and all of them have practiced repeated gastric lavage.

The work of the men mentioned above has taught the clinical men that the toxic contents of the obstructed bowel tends to accumulate in the upper intestine and enterostomies are now done in this portion of the gut. However, the mortality rate is appalling and will continue to remain high until means are developed which will aid in making an early, certain diagnosis. Whipple and his co-workers lay stress upon the increase of the non-protein nitrogen of the blood as a prognostic sign, while Bacon, Anslow and Eppler claim to have shown that this increase is due entirely to dehydration.

We recognize functional and mechanical obstruction following operation, and the life of the patient depends upon the rapidity with which we are able to diagnose the mechanical type. We must admit a functional foundation for intestinal paralysis. For instance, the organism in self-protection in the event of peritonitis puts the bowel at rest; also we meet paralytic ileus in other overwhelming toxemias where the peritoneum is not involved. Whether this is due to stimulation of the sympathetic nervous system or disturbance in the normal intestinal gradients is still an open question. Probably both have an influence.

We have seen an ileus in a patient with a large crushing injury to the thigh with profound toxemia, and autopsy showed the peritoneum, the intestine, and the mesentery free from inflammation. Similar findings are not at all uncommon in pneumonias.

We are reminded of one patient in whom we resected the cecum and part of the ascending colon with an end to end anastomosis for cancer, who developed an ileus as nearly as could be observed shortly after the operation. The patient was not in shock upon leaving the operating room.

She failed to be relieved by liberal administration of fluids both subcutaneously and intravenously, repeated gastric lavage, and even opening of a presenting loop of intestine with irrigation did not prevent a fatality. This had to be recognized as functional paralysis because at autopsy the field of operation was entirely walled off from the general cavity, there was no general peritonitis, and the anastomosis was patent, but the whole small bowel was enormously dilated.

Another patient with a bullet wound of the abdomen rode forty miles in an automobile and was operated upon ten hours after the accident. A loop of the jejunum was perforated four times and the descending colon twice. The peritoneal cavity contained a considerable amount of intestinal content and the peritoneum had thrown out a plastic exudate. Twelve inches of the jejunum was resected, side to side anastomosis done and the holes in the colon sutured. The patient did well until the third day when there was a profuse discharge of pus and the abdomen was so extremely distended that the pit of the stomach rose dome-like from the chest. A diagnosis of functional obstruction was made and a duodenal tube put in the stomach and strapped to the patient's chin with connecting tube which hung into a pail partly filled with water and placed beside the bed. The tube was left twenty-four hours and the patient slept while his stomach was washed at intervals. He was furnished with plenty of fluids subcutaneously and enormous quantities of black material drained into the pail. After this he had a smooth convalescence.

The great danger to our patients is that the surgeon often fails to make a diagnosis of mechanical obstruction because he must recognize this functional cause, or he lacks the moral courage to submit his patient to the ordeal of a second operation soon enough.

The mechanical causes of bowel obstruction during the period of convalescence are very numerous. One patient from whom a chronic appendix had been removed, when we first saw her had fecal vomiting. The abdomen was promptly opened and the coils of the intestine were found glued to the field of operation in such a way that a kink was formed and obstructed the lumen. As the loops were freed peristalsis was rapidly established even before the abdomen was closed. This patient promptly recovered.

A young girl who had an acute, gangrenous appendix removed developed obstruction within a week following appendectomy. Upon reopening the abdomen it was found filled with a thick jelly-like material which had caused a gluing together of the coils. The patient was reopened four times for obstruction following the initial operation and the cause was no doubt the rapidity with which the peritoneum threw out the fibrinous exudate. She recovered and for a number of years has had good health.

Another patient upon whom gastroenterostomy and appendectomy were performed for stomach ulcer, developed a pelvic peritonitis and partial obstruction which cleared up to be followed in the course of a week by complete obstruction. Upon

\* Read before the Fifty-first Annual Meeting of the Medical Society of the State of California, Yosemite Valley, May, 1922.

reopening the abdomen the pelvis was found matted with coils of small intestine around a rather large abscess. The abscess was drained with large tubes. The futility of any effort to unwind the obstruction in the bowel was evident, and a catheter was placed in a distended loop of the upper jejunum which drained freely for three or four days. The patient made an uneventful recovery. He had stools in four days and the opening in the small bowel closed very soon. We have been unable to account for the pelvic abscess.

Another patient from whom a gangrenous appendix had been removed made an uninterrupted recovery and was about to leave the hospital on the fourteenth day when he suddenly, as is usual in the mechanical obstruction, complained of violent pains in his abdomen. Reopening of the abdomen revealed a volvulus of the small bowel enormously distended, impacted in the pelvis. The site of the twist was near the former site of the appendix and adhesions had probably helped to cause the obstruction. There was no peritonitis. This patient promptly developed paralytic ileus which caused his death.

A nurse who was about ready to resume her duties following the removal of an acute, unperforated appendix, developed a bowel obstruction. Immediate reoperation revealed a volvulus near the site of the former operation which was easily freed and the patient recovered.

A patient upon whom a gastroenterostomy was performed a month before gave a history of very frequent vomiting following the operation. It was found at the secondary operation that the stomach had dragged the jejunum through the opening in the mesocolon which had caused almost complete obstruction of the bowel above and below the new opening. The mesocolon was freed about the gastroenterostomy opening, which was ample in size, and the stomach pulled through for three-fourths of an inch and the mesocolon stitched at this site. This patient recovered.

This is a sufficient number of examples of bowel obstruction during the convalescing period following laparotomies to cover the field. Others have reported obstruction following the Gilliam operation through a loop of small bowel caught about the round ligament in its new position, which has led most surgeons who use this operation to close the opening. Others have reported post-operative obstruction due to thrombosis of the mesentery veins, and ligation of the blood supply of the transverse colon in doing resection of the stomach has been reported. A loop of gut may be caught in the abdominal incision by a separation of the deep layers of the wound and for this reason the incision should be examined in every convalescing patient registering symptoms of intestinal obstruction. A loop of gut also may be caught in the loop of bowel following a posterior gastroenterostomy.

The differentiation between functional and mechanical obstruction is often difficult to make. A correct history and close observation is called for in each case. Early differentiation is imperative because the treatment of the types is radically different.

Functional paralysis usually comes on shortly after operation or after the development of peritonitis or toxemia. The patient does not have the grinding-like pains through the abdomen and is usually apathetic. The abdomen is tremendously distended and symmetrical; vomiting occurs, if at all, several hours after the onset of the distension and it is apt to be of the spitting-up type; gas enemas and irrigations fail to relieve the distension, but with persistence enough gas can be removed to furnish some relief and valuable information. If not relieved these patients develop rapid respiration and rapid heart action and die from toxemia, hypostatic pneumonia and failing blood pressure.

Mechanical obstruction rarely occurs before the third or fourth day and usually not until several days after operation. The patient may or may not have peritonitis. The first symptom to appear is grinding-like pains in the abdomen occurring at intervals, which is followed by vomiting usually violent and often projectile, and the patient shows decided anxiety. The distension of the abdomen and the time of the onset of vomiting depends much upon whether the obstruction is high or low in the bowel. The character of the pain is the pathognomonic symptom and is always present if an accurate history is obtained. Enemas and irrigations fail to produce results except at first the return may contain some particles of fecal matter, but there is no gas, except that which may be injected from the enema tube. Leucocytosis, probably due to dehydration, is present. Running pulse followed rapidly by shock, and death soon follows unless relief is furnished.

In the prevention of intestinal obstruction gentle handling of the tissues during operation is the most important prophylactic measure, and for this reason we advocate wide abdominal incisions.

The treatment of functional ileus is repeated gastric lavage; or better, a duodenal tube with connecting tube which hangs over the side of the bed in a pail partly filled with water; repeated enemas and high irrigations with lubricating liquids. Stimulation of the bowel with Pituitrin or Eserin in sufficient doses, each time following immediately with irrigations of the bowel which should be continued from forty to sixty minutes.

The treatment of mechanical obstruction is by operation immediately after the earliest possible diagnosis. In these operations speed is to be desired. If the obstruction is difficult to relieve it is better to put a catheter in the upper small bowel and close the abdomen. Irrigations through this catheter will drain off the toxin and the patient should be treated for shock. There will be time enough to do further operative work if necessary when the patient's condition is less critical.

In both types of obstruction there is secreted into the lumen of the intestine large quantities of water and toxins so it is evident that these patients must have a sufficient quantity of fluids. We give routinely normal salt solution subcutaneously and glucose solutions intravenously as often as required, which furnish the patient with nourishment as well as with fluids.